

REMARKS/ARGUMENTS

This Amendment is in response to the Office Action mailed January 30, 2008. Claims 1-15 were pending in the present application. This Amendment amends claims 1 and 7-9, and cancels claim 6 without prejudice, leaving pending in the application claims 1-5 and 7-15. Reconsideration of the rejected claims is respectfully requested.

Allowable Subject Matter

Claims 9 and 10 are objected to as being dependent on a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant appreciates the indication of allowable subject matter in claims 9 and 10. However, as discussed in detail below, Applicant submits that independent claim 1 (upon which claims 9 and 10 depend), as amended above, is also allowable over the cited prior art.

35 U.S.C. §103(a) Rejection of Claim 1

Claim 1 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis et al. (U.S. Patent No. 6,343,324, hereinafter "Hubis") in view of Igari (U.S. Patent No. 6,742,094, hereinafter "Igari"). Applicant respectfully submits that Hubis and Igari, considered individually or in combination, do not teach or suggest the features of this claim.

Embodiments of the present invention are directed to techniques for ensuring data security in a network-based file server system. FIG. 1 of the Specification illustrates an illustrative file server system comprising a file control unit 105, a plurality of clients 101, and a plurality of hard disk drives 103. As shown, file control unit 105, clients 101, and hard disk drives 103 are interconnected via a network 100 (e.g., a local area network (LAN)). Clients 101 are configured to issue read/write requests for data stored on hard disk drives 103. File control unit 105 is configured to receive and process the read/write requests issued by clients 101, thereby managing data input and output to hard disk drives 103. (Specification: pg. 11, lines 17-23).

In one set of embodiments, each hard disk drive 103 includes authentication information 109. Authentication information 109 includes information identifying the network devices that are permitted to directly communicate with the hard disk drive via LAN 100. (Specification: pg. 12, lines 11-14).

Further, file control unit 105 is configured to send to each hard disk drive 103 a command to establish an entry in the authentication information of the hard disk drive. This entry prevents the hard disk drive from directly communicating with devices on LAN 100 other than file control unit 105. (Specification: pg. 24, lines 1-23). An example of such an entry is shown in FIG. 5. In this manner, clients 101 are prevented from directly reading data from/writing data to hard disk drives 103, thereby improving the security of the file server system.

In accordance with the above, Applicant's independent claim 1 (as amended) recites, in part:

if the ID information is found in the configuration information of the file control unit, send to the hard disk drive a command to establish an entry in the authentication information of the hard disk drive, wherein the entry prevents the hard disk drive from directly communicating with devices on said network other than said file control unit.

(Applicant's claim 1 in part, as amended, emphasis added).

At least the above features are not taught or suggested by Hubis and/or Igari.

Hubis is directed to a system for controlling access to a shared storage device by a plurality of host computers. (Hubis: Abstract). As shown in FIG.1 of Hubis, this system includes a plurality of host computers 101-1, 101-2, 101-3 connected to a storage array controller 104. Storage array controller 104 is in turn connected to a plurality of storage volumes (*i.e.*, disk drives) 108-1 to 108-N. Further, storage array controller 104 includes a volume permission table configured to store access permissions. (Hubis: FIG. 2A, 194). When a request to access a storage volume is received from a host computer at storage array controller 104, the access permissions are used to determine whether the request is permitted or denied. (Hubis: col. 13, lines 3-11).

Igari is directed to a technique for regulating access by a host system to hidden storage areas of a hard disk drive. (Igari: Abstract).

Applicant submits that the inventions of Hubis and Igari are substantially different from Applicant's amended claim 1. For example, Hubis and Igari do not teach or suggest a file control unit configured to "send to the hard disk drive a command to establish an entry in the authentication information of the hard disk drive" as recited in claim 1. As best understood from the Office Action, the Examiner apparently construes the storage array controller of Hubis as corresponding to the recited file control unit of Applicant's claim 1, and the storage volumes of Hubis as corresponding to the recited hard disk drives of Applicant's claim 1. However, nowhere does Hubis disclose or suggest maintaining authentication information in each storage volume, or the specific step of sending a command from the storage array controller to a storage volume to establish an entry in an authentication information of the storage volume. The deficiencies of Hubis in this regard are not remedied by Igari. Accordingly, Hubis and Igari fail to teach or suggest "[sending] to the hard disk drive a command to establish an entry in the authentication information of the hard disk drive" as recited in claim 1.

Further, Hubis and Igari do not teach or suggest "wherein the entry prevents the hard disk drive from directly communicating with devices on said network other than said file control unit" as recited in claim 1. In the Office Action, the Examiner asserts that this feature is shown in Fig. 1, Fig. 3, and col. 15, lines 32-40 of Hubis. Applicant respectfully disagrees.

The cited sections of Hubis describe the steps performed in processing an I/O request received from a host computer 101-1, 101-2, 101-3 at storage array controller 104. For example, based on the host from which the request was received, the storage volume to which the request is addressed, and volume permission table 194, the request is either denied or permitted. (Hubis: col. 15, lines 32-40). As best understood from these sections, the host computers of Hubis always communicate indirectly with the storage volumes through the storage array controller. In contrast, claim 1 specifically recites establishing an entry in the authentication information of a hard disk drive that prevents the hard disk drive from directly communicating with any other network device (*e.g.*, clients) other than the file control unit. Since the host computers of Hubis cannot directly communicate with storage volumes (*i.e.*, host computers must communicate with the storage array controller), there is clearly no need in Hubis for any type of data that prevents the host computers from directly communicating with storage volumes. Accordingly, Hubis

necessarily fails to teach or suggest “wherein the entry prevents the hard disk drive from directly communicating with devices on said network other than said file control unit” as recited in claim 1.

The deficiencies of Hubis in this regard are not remedied by Igari. For example, Igari does not make any reference (and the Examiner provides no citation) to the specific concept of sending a command from a file control unit to a hard disk drive to establish an entry in the authentication information of the hard disk drive, “wherein the entry prevents the hard disk drive from directly communicating with devices on said network other than said file control unit” as recited in claim 1.

For at least the foregoing reasons, even if Hubis and Igari were combined (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features of Applicant’s claim 1. Accordingly, Applicant respectfully submits that claim 1 is allowable over Hubis and/or Igari, and request that the rejection of claim 1 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 2

Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Hubis and Igari as applies to claim 1, and further in view of Pherson et al. (U.S. Publication No. 2002/0095602, hereinafter “Pherson”). Applicant respectfully submits that Hubis, Igari, and Pherson, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 2 depends from independent claim 1, and the rejection of claim 2 is premised on the assertion that Hubis and Igari disclose the features recited in claim 1, and Pherson discloses the remaining features of claim 2.

As discussed above, however, Hubis and Igari do not disclose or suggest all of the features recited in independent claim 1. As best understood, Pherson does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis and Igari were combined with Pherson (although there appears to be no rationale for

combining), the resultant combination would not teach or suggest the various features recited in claim 2.

In view of the foregoing, Applicant respectfully requests that the rejection of claim 2 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 3

Claim 3 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis, Igari, and Pherson as applied to claim 2, and further in view of Nahum (U.S. Publication No. 2004/0078599, hereinafter “Nahum”). Applicant respectfully submits that Hubis, Igari, Pherson, and Nahum, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 3 depends from dependent claim 2, and the rejection of claim 3 is premised on the assertion that Hubis, Igari, and Pherson disclose the features recited in claim 2, and Nahum discloses the remaining features of claim 3.

As discussed above, however, Hubis, Igari, and Pherson do not disclose or suggest all of the features recited in claim 2. As best understood, Nahum does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis, Igari, and Pherson were combined with Nahum (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 3.

In view of the foregoing, Applicant respectfully requests that the rejection of claim 3 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 4

Claim 4 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis, Igari, and Pherson as applied to claim 2, and further in view of Daoud et al. (U.S. Publication No. 2002/0087694, hereinafter “Daoud”). Applicant respectfully submits that Hubis, Igari, Pherson, and Daoud, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 4 depends from dependent claim 2, and the rejection of claim 4 is premised on the assertion that Hubis, Igari, and Pherson disclose the features recited in claim 2, and Daoud discloses the remaining features of claim 4.

As discussed above, however, Hubis, Igari, and Pherson do not disclose or suggest all of the features recited in claim 2. As best understood, Daoud does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis, Igari, and Pherson were combined with Daoud (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 4.

In view of the foregoing, Applicant respectfully requests that the rejection of claim 4 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 5

Claim 5 is rejected under U.S.C. §103(a) as being unpatentable over Hubis and Igari as applied to claim 1, and further in view of Pham et al. (U.S. Publication No. 2003/0105830, hereinafter “Pham”). Applicant respectfully submits that Hubis, Igari, Pherson, and Pham, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 5 depends from independent claim 1, and the rejection of claim 5 is premised on the assertion that Hubis and Igari disclose the features recited in claim 1, and Pham discloses the remaining features of claim 5.

As discussed above, however, Hubis and Igari do not disclose or suggest all of the features recited in independent claim 1. As best understood, Pham does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis and Igari were combined with Pham (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 5.

In view of the foregoing, Applicant respectfully requests that the rejection with respect to claim 5 be withdrawn.

35 U.S.C. §103(a) Rejection of Claims 6-8

Claims 6-8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis and Igari as applied to claim 1, and further in view of Nahum. Applicant respectfully submits that Hubis, Igari, and Nahum, considered individually or in combination, do not teach or suggest the features of these claims.

Claim 6 has been canceled without prejudice or disclaimer. Accordingly, the rejection of claim 6 is moot.

Claims 7 and 8 depend (either directly or indirectly) from independent claim 1, and the rejection of claims 7 and 8 is premised on the assertion that Hubis and Igari disclose the features recited in claim 1, and Nahum discloses the remaining features of claims 7 and 8.

As discussed above, however, Hubis and Igari do not disclose or suggest all of the features recited in independent claim 1. As best understood, Nahum does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis and Igari were combined with Nahum (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claims 7 and 8.

In view of the foregoing, Applicant respectfully requests that the rejection of claims 7 and 8 be withdrawn.

35 U.S.C. §103(a) Rejection of Claims 11-14

Claims 11-14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis, in view of Igari, in view of Pherson, in view of Moulton et al. (U.S. Patent No. 7,062,648, hereinafter "Moulton"). Applicant respectfully submits that Hubis, Igari, Pherson, and Moulton, considered individually or in combination, do not teach or suggest the features of these claims.

As an initial matter, Applicant respectfully notes that the Examiner's rejection of independent claim 11 in the latest Office Action is identical to the Examiner's rejection of claim 11 in the previous Office Action mailed June 25, 2007, and yet no response to Applicant's traversal arguments presented in the Amendment filed November 26, 2007 has been provided.

Accordingly, Applicant respectfully submits that the latest Office Action is not in compliance with MPEP 707.07(f), which states “where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant’s argument and answer the substance of it.”

Since the Examiner has failed to address Applicant’s previous arguments regarding independent claim 11, these arguments are restated below. In the event that the present Amendment does not place the claims in condition for allowance, Applicant respectfully requests that the Examiner provide an adequate MPEP 707.07(f) response to Applicant’s arguments and make the next Office Action a non-final action to allow the Applicant an opportunity to respond.

Independent claim 11 recites:

A file server system comprising:
a plurality of switching hubs interconnected to form a network;
a plurality of hard disk drives connected to a plurality of clients via the network;
and
a file control unit,
each of said plurality of hard disk drives being connected to one of said plurality of switching hubs, said file control unit being connected to one of said plurality of switching hubs, said file control unit accepting an access request from said clients to said hard disk drives to manage a data input/output operation of said plurality of hard disk drives,
wherein said switching hubs perform connection control so that said file control unit and said plurality of clients belong to a first virtual network and so that said file control unit and said plurality of hard disk drives belong to a second virtual network, whereby the plurality of clients belonging to the first virtual network cannot directly communicate with the plurality of hard disk drives belonging to the second virtual network.

(Applicant’s claim 11, emphasis added).

At least the above features are not taught or suggested by Hubis, Igari, Pherson, and/or Moulton.

For example, the combination of Hubis, Igari, Pherson, and Moulton does not teach or suggest a file server system wherein “said file control unit and said plurality of clients belong to a first virtual network,” and “said file control unit and said plurality of hard disk drives belong to a second virtual network,” such that “the plurality of clients belonging to the first virtual network cannot directly communicate with the plurality of hard disk drives belonging to the second virtual

network” as recited in claim 11. In the Office Action, the Examiner concedes that Hubis and Igari make no reference to the above features, but goes on to assert that they are shown in Pherson and Moulton because “Pherson discloses hubs in a storage network ([0009]) and Moulton discloses the use of VPNs in a storage network (Col. 10, ln. 24-47).” (Office Action: pg. 12). Applicant respectfully disagrees.

Even *assuming arguendo* that Pherson discloses the general concept of “hubs in a storage network” and Moulton discloses the general concept of “VPNs in a storage network” as alleged by the Examiner, Pherson and Moulton still fail to teach the specific concepts of grouping a file control unit and a plurality of clients into a first virtual network, and grouping the file control unit and a plurality of hard disk drives into a second virtual network, whereby the clients belonging to the first virtual network cannot directly communicate with the hard disk drives belonging to the second virtual network. As described in the Specification, this network configuration obviates the need for encrypting/decrypting communications between the file control unit and the hard disk drives, thereby improving file server system performance while maintaining data security. (Specification: pg. 7, lines 3-25). Since Pherson and Moulton fail to make any reference to this specific configuration, they necessarily fail to teach or suggest a file server system wherein “said file control unit and said plurality of clients belong to a first virtual network,” and “said file control unit and said plurality of hard disk drives belong to a second virtual network,” such that “the plurality of clients belonging to the first virtual network cannot directly communicate with the plurality of hard disk drives belonging to the second virtual network” as recited in claim 11.

For at least the foregoing reasons, even if Hubis, Igari, Pherson, and Moulton were combined (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features of claim 11. Accordingly, Applicant respectfully submits that claim 11 is allowable over Hubis, Igari, Pherson, and/or Moulton, and request that the rejection of claim 11 be withdrawn.

Dependent claims 12-14 depend (either directly or indirectly) from independent claim 11, and are thus believed to be allowable for at least a similar rationale as discussed for claim 11, and others.

35 U.S.C. §103(a) Rejection of Claim 15

Claim 15 is rejected under 35 U.S.C. §103(a) “for the same reasons as claims 1 and 11-14 above.” (Office Action: pg. 12). Applicant respectfully submits that Hubis, Igari, Pherson, and Moulton, considered individually or in combination, do not teach or suggest the features of this claim.

Independent claim 15 recites:

A file server system comprising:

a plurality of hard disk drives connected to a first local area network (LAN);

a file control unit connected to a plurality of clients via a second LAN, the file control unit configured to accept access requests from the plurality of clients to the plurality of hard disk drives to manage data input and output of the plurality of hard disk drives;

a management terminal connected to the second LAN, the management terminal configured to perform maintenance work for the file control unit; and

a firewall including an access control, the firewall being located between the file control unit and the plurality of hard disk drives on the first LAN, and between the file control unit and the management terminal on the second LAN,

wherein the access control of the firewall manages communication between the plurality of clients, the file control unit, the plurality of hard disk drives, and the management terminal such that communication is allowed directly between the file control unit and the plurality of hard disk drives, but communication is not allowed directly between the plurality of clients and the plurality of hard disk drives or directly between the management terminal and the plurality of hard disk drives,

wherein the access control of the firewall cannot be set by any of the plurality of clients or the management terminal, and

wherein the file control unit includes configuration information with which a plurality of pieces of identification (ID) information, each identifying one of the plurality of hard disk drives, can be registered.

(Applicant’s claim 15, emphasis added).

At least the above features are not taught or suggested by Hubis, Igari, Pherson, and/or Moulton.

For example, the combination of Hubis, Igari, Pherson, and Moulton fails to teach or suggest a file server system that comprises “a firewall including an access control, the firewall

being located between the file control unit and the plurality of hard disk drives on the first LAN, and between the file control unit and the management terminal on the second LAN” as recited in claim 15. In the Office Action, the Examiner asserts that the above features are shown in Hubis because “Hubis discloses access control and thus acts as a firewall.” (Office Action: pg. 12; citing Hubis: col. 15, lines 32-40). Applicant respectfully disagrees.

As discussed with respect to claim 1, the cited section of Hubis describes the steps performed in allowing or disallowing an I/O request received from a host computer (and destined for a storage volume) at an intermediary storage array controller. Thus, at best, the cited section merely teaches the concept of performing access control between a host computer and a storage volume (via the storage array controller). In contrast, claim 15 specifically recites performing access control (via a firewall) between a file control unit and a plurality of hard disk drives, and between the file control unit and a management terminal. Applicants submit that Hubis is completely silent on performing access control in this particular manner. The deficiencies of Hubis in this regard are not remedied by any of the other cited references. Accordingly, Hubis, Igari, Pherson, and Moulton fail to teach or suggest “a firewall including an access control, the firewall being located between the file control unit and the plurality of hard disk drives on the first LAN, and between the file control unit and the management terminal on the second LAN” as recited in claim 15.

Further, the cited references do not teach or suggest “wherein the access control of the firewall cannot be set by any of the plurality of clients or the management terminal” as recited in claim 15. No disclosure related to this specific feature could be found in Hubis, Igari, Pherson, or Moulton.

For at least the foregoing reasons, even if Hubis, Igari, Pherson, and Moulton were combined (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features of claim 15. Accordingly, Applicant respectfully submits that claim 15 is allowable over Hubis, Igari, Pherson, and/or Moulton, and request that the rejection of claim 15 be withdrawn.

Amendments to the Claims

Unless otherwise specified, amendments to the claims are made for purposes of clarity, and are not intended to alter the scope of the claims or limit any equivalents thereof. The amendments are supported by the Specification and do not add new matter.

CONCLUSION

In view of the foregoing, Applicant believes all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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